

The Wonders of the Number Chart

Presented by Dr. Karol L. Yeatts

The number chart is one of the most versatile manipulative devices available for teaching mathematics. You can certainly count on a number chart. The number chart can be used for teaching number patterns and number relationships, operations, and problem solving. Number chart activities are designed to help elementary students in K-5th grades develop number sense and number relationships and the activities can be used with individual students, small groups or with an entire class. As extensions to each of the activities, have students create their own number chart clues and directions.

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	20
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	40
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Activity 1: Special Numbers

This activity is designed to help familiarize the students to the number chart.

Have students place five to ten counters on their very special numbers. Have students tell a partner why these numbers are important to them. Examples of special numbers may include:

Your age

The day you were born

The number of people in your family

Your favorite or "lucky" number

Your shoe size

The number of pets you have

The number of relatives you have

Your favorite sport's player's team jersey number

Activity 2: Picture It

This activity reinforces knowledge of the number chart and encourages children to visual patterns.

Have students cover the following numbers as you call them out one at a time: 1, 71, 17, 53, 44, 35, 34, 8, 78, 12, 67, 23, 45, 62, 26, 56. Ask students to guess what the picture will be before you finish calling out the numbers. If students recognize the picture before the numbers have all been called, have students tell you the next number to cover up to complete the picture.

Activity 3: Locating Number Neighbors

This activity reinforces knowledge of the number chart.

Have students use a blank number chart. Have a student select a number from 0 to 99. Everyone must find where the number belongs on the number chart. Students must then write the number neighbors. A number that is one more than, one less than, ten more than and ten less than the selected number. Continue until the chart is filled in.

Activity 4: Name Patterns

This activity introduces a variety of number patterns and relationships and lays the foundation for multiplication.

Have students use a blank number chart. Have students begin writing their first name placing one letter in each box. They continue writing their first name until they reach the end of the chart. Next, have students shade in the first letter of their name. They must shade in all of the first letters of their name every time they wrote their name. Have students find other students who have the same shaded pattern. Have students examine the patterns together and discuss what they observe. The shaded patterns are the multiples of 3, 4, 5, 6, 7, 8, 9, 10, etc. depending on how many letters are in the students name.

Activity 5: Number Patterns

This activity introduces a variety of number patterns and relationships and lays the foundation for multiplication.

- Have students begin by covering all numbers that have a 2 in either the ones or tens place. Have students discuss the patterns or number relationships they observe. For example, these numbers form a horizontal line and a vertical line. The lines meet at 22 and this number has a 2 in the ones and tens place. The vertical line increases by ten and the horizontal line increases by one. Ask if these relationships are the same for other numbers. Try covering numbers that have a six in either the ones or tens place and observe the patterns and number relationships.
- Have students cover the following numbers 11, 22, 33, 44, 55, 66, 77, 88, 99. Discuss the patterns and number relationships: One pattern students might notice is that the sums of the digits (11 is $1 + 1 = 2$; 22 is $2 + 2 = 4$) are 2, 4, 6, 8, 10, 12, 14, 16, 18. These are all even numbers.
- Have students cover 1, 12, 23, 34, 45, 56, 67, 78, 89. Ask what they notice about the sum of the digits with these numbers. They may notice that the sums of the digits are 1, 3, 5, 7, 9, 11, 13, 15, 17. These are all odd numbers. Ask students to try the numbers on the next diagonal and see what happens.
- Have students cover the following numbers and discuss their observation: 5, 14, 23, 32, 41, 50. Students may notice that the sum of the digits all equal 5 and that 5 was the first number covered.
- Have students cover 7, 16, 25, 34, 43, 52, 61, 70. Notice what the sum of the digits equal. (7) Check to see if this pattern holds for other diagonals.
- Provide students with an opportunity to discover additional patterns and number relationships that they observe.

Activity 6: Counting On

This activity lays the foundation for addition.

Have students cover numbers as you give the directions. Start with:

22 and count on 3 more	54 and count on 1 more	43 and count on 2 more
37 and count on 6 more	42 and count on 2 more	36 and count on 10 more
63 and count on 2 more	30 and count on 5 more	41 and count on 6 more

Activity 7: More Than

This activity reinforces the concept of more than and reinforces the concept of addition.

Have students cover numbers as you give the directions. Start with:

3 more than 11	5 more than 52	1 more than 54	3 more than 50	4 more than 63
2 more than 50	10 more than 26	6 more than 41	4 more than 47	
2 more than 83	8 more than 86	10 more than 40	9 more than 45	
1 more than 57	3 more than 73	5 more than 20	1 more than 55	

Activity 8: Counting Back

This activity lays the foundation for subtraction.

Have students cover numbers as you give the directions. Start with:

35 and count back 2	27 and count back 2	46 and count back 2	27 and count back 1
47 and count back 4	30 and count back 7	58 and count back 3	29 and count back 5
54 and count back 1	39 and count back 3	39 and count back 5	49 and count back 4
58 and count back 2	57 and count back 3	49 and count back 3	38 and count back 3

Activity 9: Less Than

This activity reinforces the concept of less than and reinforces the concept of subtraction.

Have students cover numbers as you read each clue.

3 less than 46	2 less than 79	1 less than 76	2 less than 78
1 less than 4	6 less than 80	4 less than 27	3 less than 76
5 less than 58	2 less than 65	3 less than 36	7 less than 20

Activity 10: Ten More or Less

This activity reinforces an understanding of counting by tens. It also serves as a foundation in place value.

Have students place a marker on the number that is 10 more than or 10 less than:

10 more than 2	10 more than 6	10 less than 42	10 more than 56	10 less than 52
10 more than 55	10 less than 25	10 less than 48	10 more than 38	10 more than 12
10 more than 48	10 less than 38	10 more than 34	10 less than 27	10 less than 62
10 more than 24	10 more than 44	10 less than 72	10 more than 14	10 more than 57

Activity 11: BINGO

This activity reinforces an understanding of place value with tens and ones.

Place the numbers 0-99 in a container. Have a student take a number out and call out the number as ten and ones. For example the number 54 would be 5 tens and 4 ones. Have students cover the number on their number chart that was called out. Students take turns taking numbers out of the container, calling them out, and covering the numbers on their number chart. The game ends when students complete either a horizontal row or a vertical column.

Activity 12: Adding and Subtracting on the Number Chart

This activity provides an opportunity for students to practice adding and subtracting using the number chart as a tool.

Demonstrate how to add numbers using the number chart. ADD: $23 + 38$. Have students place a chip on 23. Next, ask them how many tens are in 38 (3 tens). Remind them that each of the horizontal rows on the number chart increase by ten so count down 3 rows from 23 (33, 43, 53). Ask what students what the 8 represents in the 38 (the ones units). Remind students that the vertical columns count by ones so count to the right 8 spaces from the number 53 (54, 55, 65, 57, 58, 59, 60, 61). Students should land on 61. $23 + 38 = 61$. Demonstrate several more examples and then let students practice adding using their charts.

Demonstrate how to subtract using the number chart. SUBTRACT: $62 - 34$. Have students place a chip on 62. Ask students how many tens are in 34 (3 tens). Count up 3 horizontal rows from 62 (52, 42, 32). Ask students what the 4 in 34 represents (4 ones). Have students count to the left 4 spaces from 32 (31, 30, 29, 28). Students should land on 28. $62 - 34 = 28$. Demonstrate several more examples and then let students practice subtracting using their charts.

Activity 13: The Ultimate Addition Challenge

This activity investigates different ways sets of numbers can be added.

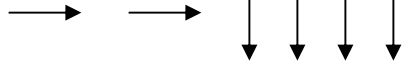
Following in the footsteps of a great mathematician name Gauss, have student add up all the numbers on the number chart. Before they begin, tell students the story of how one day a teacher asked the students to add together all of the numbers from 0-100. The teacher hoped that this activity would keep the students busy for some time. However, one student, Carl Friedrich Gauss (1777-1855), solved the problem in less than 2 minutes. How did he do it? Challenge students to figure out how Gauss added all of the numbers so quickly. Gauss summed the integers from 1 to 100 instantly by spotting that the sum was 50 pairs of numbers each pair summing to 101 which equals 5050. What would the total be if you added the numbers from 0-99?

Activity 14: Arrow Clues

This activity provides reinforcement in counting by tens and ones.

Choose a starting number and a secret number and a secret number. Using arrow clues, tell students how to find the secret number. Horizontal arrows move forward or backward one space as they count by ones. Vertical arrows move up or down by tens. For example have students start on 47. Show them the following arrow clues.

Student move one space to the right, then another space to the right. Next, students



Move down a row four times. They should land on 89.

Have students write the equation to describe the moves to get from the starting number to the secret number.

For example: $47 + 1 + 1 = 10 + 10 + 10 + 10 = 89$

Activity 15: Skip Counting or Naming Multiples

This activity reinforces an understanding of skip counting, multiples and multiplication.

- Have students cover the numbers as they skip count by twos (0, 2, 4, 6, 8, 10...98). Have students identify the pattern. The numbers cover make five straight horizontal lines. These are the even numbers and are the multiples for 2. These numbers all end with 0, 2, 4, 6, 8.
- Have students cover the numbers as they skip count by threes. Have students identify the patterns. The multiples of 3 form diagonal lines. The sums of the digits are 3, 6, 9, 12, 15, 18.
- Have students cover the numbers as they skip count by 4, 5, 6, 7, 8, 9, and 10. Discuss the patterns and relationships.

Activity 16: Finding Common Multiples

This activity reinforces an understanding of skip counting and multiples.

Have the students cover the multiples of 3. Next have students cover the multiples of 4. Have students record the numbers that have two chips on them (12, 24, 36, 48, 60, 72, 84, 96). Explain that these numbers are called common multiples. Have students identify the least common multiple (12). Have students identify the greatest common multiple for 3 and 4 shown on the number chart (96). Have students identify other common, least common and greatest common multiples.

Activity 17: Prime Time

This activity introduces the students to prime numbers.

Have students predict how many prime numbers are between 0 and 99. Have students cover the numbers as you give the following directions. Cover all the multiples of 2 beginning with the number 4. Cover all of the multiples of 3 beginning with 6. Cover all the multiples of 4. Cover all the multiples of 5 beginning with 10. Cover all the multiples of 6. Cover all of the multiples of 7 beginning with 14. Identify the remaining numbers (2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97) these are the prime numbers. Explain that prime numbers only have two factors, 1 and the number itself. Primes are only divisible by themselves and one.

Activity 18: Money Values

This activity reinforces the values of coins.

Have student cover numbers that have the same value as:

3 nickels	1 quarter, 1 dime, and 2 pennies	1 quarter and 8 pennies
4 nickels and 4 pennies	2 quarters, 2 dimes, 1 nickel and 2 pennies	1 quarter
1 dime, 2 nickels and 6 pennies	2 quarters, 1 dime, 1 nickel and 1 penny	3 quarters, 2 nickels, and 1 penny
6 dimes, 2 nickels, and 3 pennies	2 quarters, 2 dimes, 2 nickels and 4 pennies	3 quarters and 1 dime
2 dimes, 4 nickels and 4 pennies	2 quarters and 1 nickel	19 nickels

Activity 19: The Answer Stacks Up!

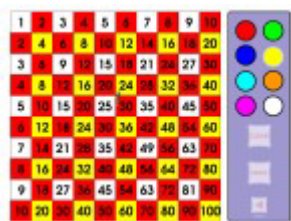
This activity reinforces mathematical thinking.

Have children use their number chart to solve the riddle to guess the secret number.

- Example #1: Cover numbers whose ten's digit is one more than the one's digit. Of the numbers that have been covered, stack a second chip on top of all of the odd numbers. Place a third chip on the stack of numbers divisible by 5. Which number has the most chips stacked on it? That's the answer!
- Example #2: Cover numbers whose digits are both the same. Place a chip on the stack of numbers whose sum of their digits is even and the product is odd. Stack a chip on numbers whose sum of their digits is 3 less than their products. Which number has the most chips stacked on it? That's the answer!

Activity 20. Internet Resources

Teaching Tables: <http://www.teachingtables.co.uk/> or <http://www.teachingtables.co.uk/paint/paint99.html>



Scroll down the page until see the Number Chart and following description
Find and explain as many patterns as possible: for example, the symmetry in the squares, the pattern of square numbers, multiples of 3, multiples of 4...

1-100 Number Square

0-99 Number Square

Click on either 1-100 or 0-99 Number Squares and enjoy painting number patterns.

Mending the Number Board: <http://www.bbc.co.uk/schools/numbertime/games/mend.shtml>

This puzzle reinforces the ordering of numbers from 10 to 100 and the patterns found on a 100 square. Students are asked to select the missing number and slide it into place to mend the number board.

Number Square Activity: <http://www.primaryresources.co.uk/online/numbersquare.swf>

This site allows students to paint numbers as they identify the number patterns and relationships.

Learning about Number Relationships and Properties of Numbers

Using Calculators and Hundred Boards: Displaying Number Patterns:

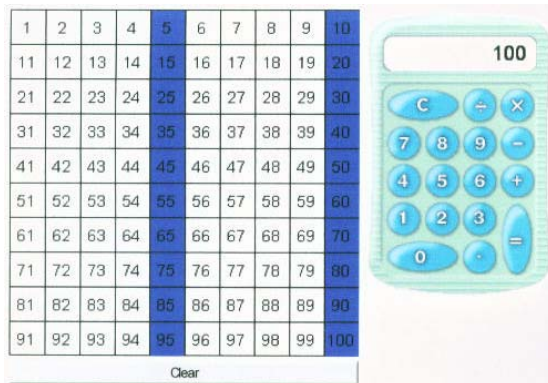
<http://standards.nctm.org/document/eexamples/chap4/4.5/index.htm>

Learning about Number Relationships and Properties of Numbers

Using Calculators and Hundred Boards: Patterns to 100 and Beyond:

http://standards.nctm.org/document/eexamples/chap4/4.5/calc_full/part2.htm

The above two sites are part of the National Council of Teachers of Mathematics (NCTM) website that address the NCTM Principles and Standards for School Mathematics. The above activities have interactive number charts for students to complete along with questions to help guide children's thinking.



Creating a 0-99 Number Chart: http://www.coastlink.com/users/sbryce/mathwork/hundred_chart.htm

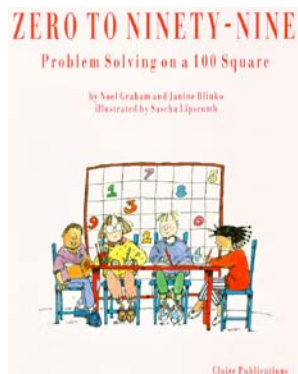
This site provides a number chart that can be copied for student use.

References

Zero to Ninety-Nine: Problem Solving on a 100 Square (1997)
Claire Publications.

Hundreds Board Activities (1995)
Carson-Dellosa Publishing Company

1-100 Activity Book (1990)
Learning Resources



Janine Blinks and Noel Graham

